

TOHDA
Appl. No. 10/055,896
February 13, 2004

REMARKS/ARGUMENTS

Reexamination of the captioned application is respectfully requested.

A. SUMMARY OF THIS AMENDMENT

By the current amendment, Applicant basically:

1. Amends independent claim 1 by incorporating therein the subject matter of dependent claim 5.
2. Amends dependent claim 6 to depend from dependent claim 3 rather than from independent claim 1.
3. (Similarly to 1) Amends independent claim 9 by incorporating therein the subject matter of dependent claim 13.
4. Amends dependent claim 14 to depend from dependent claim 11 rather than from independent claim 9.
5. Cancel claims 5 and 13 without prejudice or disclaimer.
6. Respectfully traverses all prior art rejections (see section B infra).

B. PATENTABILITY OF THE CLAIMS

Claims 1-4 stand rejected under 35 USC 102(b) as being anticipated by U.S. Patent 5,798,903 to Dhote et al. Claims 1-6 and 9-14 stand rejected under 35 USC 103(a) as being unpatentable over U.S. Patent 5,245,505 to Shiga to U.S. Patent 6,218,238 to Huang et al. Claims 5 and 6 stand rejected under 35 USC 103(a) as being unpatentable over U.S. Patent 5,798,903 to Dhote et al. All prior art rejections are respectfully traversed for at least the following reasons.

As amended, both independent claim 1 and independent claim 9 contain the limitation that

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a height or a depth of the convex or concave region formed on the upper surface of the ferroelectric layer is not greater than half a thickness of the ferroelectric layer, and is at least half a thickness of the upper electrode layer.

The Examiner has essentially admitted that no applied reference teaches this italicized subject matter (extracted from former dependent claims 5 and 13). Yet essentially without any technical basis, the Examiner alleges that the subject matter of these dependent claims is a "general condition" disclosed in the prior art and that discovering such optimal or workable range would involve only routine skill in the art. See, e.g., the first and last paragraphs on page 5 of the Office Action.

Applicant has achieved an "anchoring phenomena" for enabling fabrication of a capacitor in a manner that avoids a prior art problem of peeling of an electrode layer or a ferroelectric layer. The cause of the peeling problem is discussed, e.g., in the closing paragraphs of page 4 of the specification.¹ Applicant has further determined the best range of the height or a depth of the convex or concave region to avoid the peeling problem.

No applied prior art reference even addresses the particular peeling problem solved by Applicant. Therefore, it is unavailing to allege that determining such range would be involve only routine skill in the art. Incidentally, the citation to In re Aller appears incorrect: if the Examiner persists with this rejection, Applicant would appreciate either correction of the citation or a copy of the decision.

¹ In brief, in the prior art when a resist is utilized for etching the ferroelectric layer so that the ferroelectric layer acquires a desired size, the etching process results in an etching "depot" being formed on the resist. The etching depot is removed by washing using a washing solution. Unfortunately, the washing solution tends to penetrate between the ferroelectric layer and the upper electrode layer to cause a separation. This separation, coupled with differences in layer shrinkage rates during an annealing process, results in the peeling of the upper electrode layer from the ferroelectric layer as illustrated in renumbered Fig. 4.

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Independent claim 9 further requires that the

convex or concave region is formed on the upper surface of the ferroelectric layer in a manner such that a non-smooth region on the ferroelectric layer upper surface is not aligned, in a direction perpendicular to a thickness of the ferroelectric layer, with a non-smooth region on the upper electrode upper surface

Contrary to the third paragraph on page 4 of the Office Action, Dhote's non-smooth region on an upper surface of ferroelectric layer 50 is aligned with a non-smooth region on an upper surface of Pt electrode 54. Since it seems fairly clear that alignment does occur in Dhote, independent claim 9 and claims dependent thereon are allowable for this additional reason.

Accordingly, all prior art rejections should be withdrawn.

C. MISCELLANEOUS

In view of the foregoing and other considerations, a formal indication of allowance is earnestly solicited.

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

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Respectfully submitted,

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